

Marine origin *Ratna Mukta*: A Review

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ABSTRACT

Rasa Shastra has numerous numbers of *Rasa Dravya*'s which are categorized based on their qualities, attributes, and other characteristics. *Mukta* being calcium carbonate is included in *Navaratna* (precious stone) because of its superior characteristics and qualities. It is found in the ocean. Since ancient times, *Mukta* has been prized for its ornamental qualities and is advised to wear in astrology because it strengthens the moon's power. In *Ayurveda*, *Mukta* has been used in various ailments like *Rajayakshma*, *Kshata*, *Kshaya*, *Kasa*, *Swasa*, *Daha*, *Bhrama*, *Murcha*, *Jwara*, *Santapa*, *Agnimandya*, *Prameha*, *Unmada*, *Dhristiroga*, *Virya Ksaya*. This review is a small attempt to organize and compile information about *Mukta* that is found in Ayurvedic classics.

Key Words *Mukta*, *Ratna Varga*, *Rasashastra*

Received 06th February 2025 Accepted 07th May 2026 Published 10th May 2026

INTRODUCTION

Rasa Shastra is a pharmaceutical science of *Ayurveda* which deals with conversion of the drugs irrespective of their nature i.e. herbal, animal or mineral in an absorbable form which are capable in curing and preventing the body from diseases without rendering any toxic effects. *Rasa shastra* includes detailed description of *Dravya*'s which are classified according to the properties and characteristics of the *Dravya*. *Mukta* is a marine origin *Dravya* which is included in *Navaratna Varga* (precious stone) in *Rasa Ratna Samucchaya*. According to the *Atharva Veda*, meaning of *Mukta* (pearl) is that which grants the body relief from illnesses and

difficulties. *Mukta* is an organic gem that is obtained from oysters found in the sea or pearl oysters. *Mukta* is called "pearl" in English. Cesloid worms which exist in the oyster shell prepare the pearl. It is said that *Mukta* is associated to *Chandra Graha*, and one can wear it to appease *Chandra*.

A pearl is a hard, shiny substance that forms in the soft tissue (more precisely, the mantle) of an animal, living shelled mollusc or a fossilized conulariids, Similar to a mollusc's shell, a pearl is made of tiny, crystalline calcium carbonate that has accumulated in concentric layers. This calcium carbonate is primarily aragonite or a combination of aragonite and calcite.

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MYTHOLOGICAL ORIGIN

- Pearls are said to have come from the fragments of the demon *Bala's* teeth.
- On *Svati Nakshatra*, it is thought that if a drop of rainwater lands inside a *Sukti* floating on the sea. The droplets transform into fine pearls.

HISTORICAL REVIEW

- The *Mahabharata*, *Sri Mad Bhagavat*, makes multiple references to *Mukta*, for wearing.
- In *Charak Samhita*, *Mukta* is a substance that improves strength and memory. *Daha Jwara* (fever and burning sensation) is another indication for it. *Mukta* was a component of *Muktadi Churna* which is used to treat cough, asthma, and hacking cough. Wearing it in *Grishma Ritu* has also been recommended.
- In *Sushrut Samhita*, *Mukta* is mentioned as *Chakshushya* and included in *Parthiva Aushadhi*.
- In *Ashtanga Hridaya*, *Mukta* has been mentioned by *Vagbhaṭa* in *Kashaya Skandha*.
- In his literature *Bhava Prakash*, *Bhava Mishra* has discussed therapeutic application, synonyms, *Shodhana* and eight *Yoni* of *Mukta*.
- In *Rasendra Chudamani* (13th century), *Sri Somadeva* included *Mukta* in the *Navaratna* group. He discussed the characteristics of *Mukta* that are acceptable and unacceptable and therapeutic uses.
- In his book *Rasa Ratna Samucchaya* (13th century), *Vagbhaṭa* also discussed the characteristics of excellent and inferior kinds as well as the medicinal uses of *Mukta*.
- In his text *Rasa Sudhakara* (13th century), *Yasodhara Bhatra* placed *Mukta* in *Navaratna*.

He also discussed *Mukta's* acceptable and unacceptable attributes, five *Ratna doshas*, *Shodhana* and *Marana*. He has also described how to make artificial pearls and specified a few *Yogas* that consist of *Mukta*.

- In his book *Ayurveda Prakash* (17th century), *Mukta* has also been included to the *Nava Ratna* and *Maha Ratna* groups by *Acharya Madhava*. He has also discussed the eight roots (*Yoni*) of *Mukta*, four *Maha dosas*, six *Samanya dosas*, their effects, and their many forms of lustre, such as *Madhu Chaya*, *Sita Chaya*, and *Srikanda chaya*.
- In his text *Rasa Tarangini* (20th century), *Sri Sadananda Sharma* has carefully explained the synonyms, acceptable and non-accepted traits, *Shodhana* and *Marana*, as well as the therapeutic implications of *Mukta*.
- *Rasendra Sara Sangraha* (13th century), *Rasa Kamadhenu* (17th century), and *Bhaishajya Ratnavali* have mentioned several *Mukta* containing *Yogas* for different diseases.

VERNACULAR NAMES

Sanskrit – *Mukta*

Hindi - *Moti*

Tamil and *Mulayam* – *Muttu*

Arabi – *Lolo*

Persian – *Marva reed*

Telugu - *Mutiamu*

English – *Pearl*

Latin name – *Pinctada Margaritafera* or *Mytilus Margaritiferus*

Chemical formula- CaCO_3

PLACE OF AVAILABILITY^{1,2}

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Found in general molluscs inhabiting shallow sea and sand-banks.

Basra in Iraq, Japan, China, Philippines, Mexico, Iran, Arabian sea, Persia, muscat, Australian sea, Sri Lanka, Jamnagar and Rameshwaram in India.

Hyderabad is good market for pearls.

SYNONYMS^{3,4}

Mukta, Saumya, Mauktika, Shuktija, Muktaphala, Sauktikeya, Tara, Taraka, Ambhasara, Niraja, Shitala, Nakshatra, Induratna, Binduphala, Savacha, Shuklamani, Shashipriya, Shaktimani, Hima, Hemvata, Sudhanshuratna, Subharama, Shashiratna, Chandraratna, Chandrapriya.

SOURCES OF ORIGIN⁵

Mukta has 8 sources of origin.

1. *Sukti* (oyster shell)
2. *Sankha* (conch shell)
3. *Gaja / Matanga* (elephant)
4. *Varaha / Moutri* (pig)
5. *Sarpa / Uruga* (snake)
6. *Matsya / Meen* (fish)
7. *Dardaru / Ambukbhrita* (frog)
8. *Venu / Twak Sara* (bamboo)

TYPES

According to Source:

- i. Fresh water pearls – it comes from mussels which lives in rivers, lakes etc.
- ii. Sea water pearls – it comes from the oyster which lives in ocean.

According to formation:

- i. Natural – made by oyster
- ii. Cultured - made by introducing sand or small piece of mettle of oyster or mussel.

- iii. Imitation pearl – made from mother of pearl or conch shell and Others are composed of glass and are covered in essence D Orient, a solution formed of fish scales.

PHYSICAL PROPERTIES

Category - Carbonate mineral, protein

Formula - Calcium carbonate (CaCO_3) and Conchiolin

Colour - White, pink, silver, cream, brown, green, blue, black, yellow, orange, red, gold, purple, iridescent

Cleavage - None

Fracture - Uneven, various

Mohs scale hardness - 2.5–4.5

Streak - White

Specific gravity - 2.60–2.85

Refractive index - 1.52-1.66

Lustre – pearly

FORMATION OF PEARL

When some foreign material enters the oyster between the mantle and the shell which irritates the mantle. The oyster forms a pearl sac from external mantle tissue cells and starts to secrete a secretion to cover up the irritation. It deposits layers of Calcium Carbonate (CaCO_3) in the form of aragonite or a combination of calcite and aragonite, held together by an organic compound resembles a horn called conchiolin. This combination of aragonite and conchiolin is called nacre, which makes the mother of pearl. Common triggers include organic matter, parasites, or even injury that causes the mantle tissue to shift to a different area of the mollusc's body. The irritant in cultured pearls is usually a

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segment of the mantle epithelium that has been inserted, either with or without a spherical bead (beaded or bead less cultured pearls). It can be removed after 6 months.

GRAHYA LAKSHANA⁶

The moon-like or star like or water like lustre, greater size, attractive appearance, white colour, smooth texture, circular shape, absence of symbols, decent mass and procured from good place characterize the desired *Mukta*. It retains its colour and lustre even after being rubbed with gomutra and salt.

There are 3 lustres of *Mukta*⁷

1. *Madhu* (honey)
2. *Sita* (sugar)
3. *Srikhandā* (a sweet)

u{k=kHka o`ÙkeR;Ureqāa fLuX/ka Lfkwyā fueZya fuoz.ka pA

U;Lra /kÙks xkSjoa ;Ùkqyk;ka rfUueksZY;a ekSfāda lkS[;nkf; AA ¼vk- ç- 5@66½

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AGRAHYA LAKSHANA

Poor characteristics of pearls include their long, oval shape, rough texture, black or coppery colour, surface scratches, cracked, dull, and salt-like look, and small size.

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TEST FOR UTTAMA MUKTA⁸

Jatya Mukta is chosen by a test that involves rubbing with husk, submerging the *Mukta* in a vessel that contains *Gomutra*, *Lavana*, and *Kshara*. The *Mukta* is regarded as the greatest if its appearance doesn't change.

Test of purity:

Natural pearls from cultured pearls can be distinguished by using gemmological X-ray equipment to examine the centre of a pearl. With X-rays it is possible to see the growth rings of the pearl, where the layers of calcium carbonate are separated by thin layers of conchiolin. A natural pearl has a cluster of concentric growth rings, while a beaded cultured pearl has a solid core devoid of any rings. Whereas bead less cultivated pearl may have development rings in addition to a complicated centre cavity that serves as a testimony to the early precipitation of the young pearl sac.

SHODHANA

Shodhana is the procedure used to eliminate the *Dravya* of all impurities, dangerous substances and it also boost drugs therapeutic power. *Shodhana* of *Mukta* is given different in all

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different text book. Most common method of *Shodhana* by *Swedana* (boiling under liquid bath). *Swedana* is done by using the *Dola Yantra* method, the material is heated for the

specified amount of time in the suitable liquid media. Most text have given *Swedana* in *Dola Yantra* by *Jayanti Swarasa*. All the reference of *Shodhana* with details is mentioned in Table 1.

Table 1 *Shodhana* procedures of *Mukta*

S No.	Principle	Dravya	Yantra	Duration	Reference
1	<i>Swedana</i>	<i>Jayanti Swarasa</i>	<i>Dola yantra</i>	3 hours	R. T 23/67 Sh. Sa. Ma. 11/87 R. P. S. 7/54 Ra. Cu. 12/54 Y. R. Page 131
2	<i>Swedana</i>	<i>Agastya Swarasa</i>	<i>Dola yantra</i>	3 hours	R. T 23/68
3	<i>Paka</i>	<i>Mukta</i> is kept in <i>churnodaka</i>	<i>patra on surapradipta Agni</i>	3 hours	R. T 23/69
4	<i>Swedana</i>	<i>Go mutra</i>	<i>Dola yantra</i>	3 hours	B. R. R. S. 201

R.T – Rasatrangini, Sh. Sa. Ma. - sharangdhar Samhita madhyam khand, R. P. S. – rasa Prakash Sudhakar, Ra.Cu.- Rasendra chudamani, Y.R.- Yogaratnakar, B.R.R.S- Bhrihta Rasa Raj Sundhar

MARANA

Marana (incineration) is the procedure that turns the refined metals and minerals into *Bhasma* after putting them through *Bhavana* (Levigation) with

Swarasa (Juice) and *Agni Samyoga* (*Putra*). All the mentioned reference of *Marana* is mentioned in Table 2.

Table 2 *Marana* procedures of *Mukta*

S No.	Media	Putra/method	No.	Reference
1	<i>Go Dugdha</i>	<i>Laghu putra</i>	3	R. T. 23/70
2	<i>Gulab Jal</i>	<i>Laghu putra</i>	3	R. T. 23/70
3	<i>Ghritkumari, Cholayi Swarasa, stree Dugdha</i>	<i>Nirvapana</i>	7	B. R. R. S.
4	<i>Sudha Mukta + kajjali in go Dugdha</i>	<i>Gaj putra</i>	-	B. R. R. S.
5	<i>Ghritkumari</i>	<i>Gaj putra</i>	-	R. A. Sharangdhara Rasendra chudamani
6	<i>Kumari Swarasa, tanduliya Swarasa and Sthanya (breast milk)</i>	-	7	<i>Rasa Chandranshu, Purva Khand, slok no. 357</i>

BHASMA PROPERTIES^{9,10}

Rasa: Madhura

Guna: Sheeta, Laghu, Snigdha

Virya: Sheeta

Vipaka: Madhura

Karma: It has a cooling effect, aphrodisiac properties, is an appetizer, relieves burning sensations, is good for the eyes and aids in the promotion of composure, promotes the formation

of teeth and bones, is beneficial for the heart, enhances brain function and *Vishahara*.

Chemical constituents - CaCO_3 (92 %) in aragonite form with organic substance conchiolin (6%) and water (8 %).

THERAPEUTIC USES^{11,12}

Rajayakshma, Kshata, Kshaya, Kasa, Swasa, Daha, Bhrama, Murcha, Jwara, Santapa, Agnimandya, Prameha, Unmada, Dhristiroga, Virya Ksaya.

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BHASMA MATRA (DOSE)¹³

1/4th Ratti to 1 Ratti according to *Roga* and *Rogi Bala* and *Kala*.

ANUPANA

Honey, *Navneeta*, *Malai* etc.

YOGAS

Mukta Bhasma, *Mukta Pisti*, *Muktadicurna*, *Muktapanchamrita Rasa*, *Caitanyodaya Rasa*, *Chintamani Rasa*, *Suvarnamuktadi Gutika*, *Hikkantaka Rasa*, *Maha Kalyanavati*, *Svasakasa Chintamani Rasa*, *Slesmantaka Rasa*, *Mriganka Rasa*, *Vasantamalati Rasa*, *Hamsapottati Rasa*, *Hiranyagarbha Pottali Rasa*, *Yogendra Rasa* Etc.

PREVIOUS RESEARCH WORK

➤ Study done on *Mukta Bhasma* to improve the effectiveness of antibiotics against different bacteria, a lower dose of antibiotic was needed in relation to the test antibiotics antibacterial effect¹⁴.

➤ Study was done for standardization of *Mukta bhasma*. Result show the MB contain CaCO₃ in calcite form and average particle size is 156 nm¹⁵.

➤ In this study, aim of the present work was develop and evaluate *Mukta Bhasma* tablets using starch and acacia as a binder. The prepared tablets were evaluated for different parameters; acute toxicity of *Mukta Bhasma* was conducted on albino rats. *Mukta Bhasma* was administered orally in albino rats of single maximum limit dose 2000 mg/kg and general behavioural observation along with any mortality was recorded. Acute toxicity study shows that there is no adverse effect of bhasma on albino rats even

at a single dose of 2000 mg/kg body weight that reveals that *Mukta Bhasma* is safe in albino rats. The results suggest that this ayurvedic preparation cannot show any signs and symptoms of toxicity¹⁶.

➤ In this study, *Mukta Bhasma* 200mg has shown significant (p<0.001) reduction in the LPO level, increase in CAT and GSH representing significant antioxidant activity of *Mukta bhasma*. The histopathological study showed reduction in fatty degeneration of liver in MB 200mg/kg body weight. Thus, results revealed that *Mukta Bhasma* afford significant hepatoprotective and antioxidant effects in CCl₄ induced hepatic damage¹⁷.

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